Safety and Security

Safety and security are closely linked topics, but for the right safety or security glass to be specified, a clear distinction has to be drawn between the two.

Safety
In glazing terms, the word safety is applied to glass which is capable of reducing the risk of injury from accidental actions by impact, fracture, shattering or fire.

Security
The term security, however, applies specifically to glazing which is designed with deliberate forms of attack in mind. The primary security needs can be classified as:
• Physical attack: protecting people or goods against deliberate forms of close-quarter attack
• Blast resistance: where there is a danger of explosions, both internal and external

Products
• Pilkington T glass & Pilkington Pyroshield™ Safety. Used to address safety requirements, i.e. accidental damage. Toughened glass is up to five times stronger than ordinary glass and, when broken, forms relatively harmless granules. Pilkington Pyroshield™ Safety holds the glass in place with wire, to reduce the risk of injury, if the glass is broken.
• Pilkington Optilam™, Pyrodur™ & Pyrostop™. Laminated glass consists of a sandwich of glass and interlayers that remain in place after impact, to reduce the possibility of injury. Pilkington Optilam™ can be used for safety, security and noise control. Pilkington Pyrodur™ & Pyrostop™ offer additional varying levels of fire resistance, as well as the impact resistance of laminated glass.

Building Regulations

Safety
England and Wales – Part N
• Glazing – safety in relation to impact, opening and cleaning
Scotland – Part P
• Building standards (Scotland) regulations – 1990, Part P ‘Miscellaneous hazards’
Northern Ireland – Part V
• Glazing – safety in relation to impact, opening and cleaning
Satisfying the requirement in critical locations

1 Glazing in doors
Glazing in doors which is wholly or partially within 1500mm from floor level shall be:
Minimum Class C to BS 6206:1981 and marked according to BS 6206.

2 Glazing adjacent to doors
Glazing which is wholly or partially within 300mm of the edge of a door and wholly or partially within 1500mm of floor level shall be: Minimum Class C to BS 6206 and marked to BS 6206.
Note: In both 1 & 2, if the smaller dimension of the pane is greater than 900mm it shall be: Minimum Class B to BS 6206 and marked according to BS 6206.

3 Low level glazing (excluding guarding) not covered by 1 or 2
Glazing which is wholly or partially within 800mm of the floor level shall be: Minimum Class C to BS 6206 and marked according to BS 6206.

Exceptions
- Panes having the smaller dimension less than 250mm and of area less than 0.5m² may be minimum 6mm (nominal) thick glass not complying with BS 6206
- Panes forming parts of fronts (but not other locations) to shops, showrooms, offices, factories and public buildings, supported on all edges, may be of equivalent robustness not complying with BS 6206:
  - 8mm must not exceed 1100 x 1100mm
  - 10mm must not exceed 2250 x 2250mm
  - 12mm must not exceed 3000 x 4500mm
  - 15mm (and thicker) – no limit
- Panes protected by a suitably designed barrier

4 Stairs, ramps and barriers
Scotland – ‘The Building Standards (Scotland) Regulations 1990 Part S: Stairs Ramps and Protective Barriers’


For new buildings and for buildings subject to major refurbishment, the requirements for glazing when incorporated in the designs for stairs, ramps and barriers can be found in the following documents: Approved document K “Protection from falling, collision and impact” BS 6180:1999 and BS 6399: Part 1: 1996 “Code of practice for dead and imposed loads”.

5 Overhead glazing

In most types of buildings, in sloping or horizontal overhead glazing situations, it is generally regarded as appropriate to install glass which will either tend to stay in place if it is cracked (Pilkington Pyroshield™, Pilkington Pyroshield™ Safety or Pilkington Optilam™) or to fracture into relatively harmless pieces (Pilkington T glass) which are less likely to cause serious injury, if they fall, than sharp shards of annealed glass. Further guidance can be found in BS 5516, briefly summarised in Table 1.

There are some exceptions to these requirements for safety glass, based on the robustness of annealed glass.

Test methods

Safety

The impact safety performance of glass is determined in accordance with BS 6206. It requires that the glass does not break or breaks safely when subjected to impact from a lead-shot filled bag weighing 45kg. Three classification levels are achievable, with Class A being the highest.

The impact safety performance of Pilkington Optilam™ is detailed in Table 2. Pilkington T glass is Class A.

Note: BS EN 12600 is the new pendulum impact test standard for classifying flat glass products by performance under impact and by mode of breakage. In the future, references to BS 6206 in BS 6262-4 and relevant Building Regulations (e.g. Part N in England and Wales) are likely to be superceded by BS EN 12600:2002.

5 BS EN 12600:2002

Glass in building - Pendulum test - Impact test method and classification for float glass.

Similar to the swing bag test in BS6206 a weight cushioned with two rubber tyres is allowed to swing at the glass from 3 heights.
The classification has three components:

1) The first is the drop height class (i.e. 1, 2 or 3) at which the product did not break or where it broke in accordance with the first two types of breakage as follows:

   a) Numerous cracks appear, but no shear or opening that allows 76mm diameter sphere to pass through when a maximum force of 25N is applied. There is also a measurement of glass spall weight taken after a period from the impact.
   
   b) Disintegration occurs and the 10 largest crack free particles are collected within a period after impact and weighed all together and found to be under a prescribed limit.

2) The second is the mode of breakage defined as:

   TYPE A - numerous cracks appear forming separate fragments with sharp edges, some of which are large. Typical of annealed glass.
   
   TYPE B - numerous cracks appear, but the fragments hold together and do not separate. Typical of laminated glass.
   
   TYPE C - disintegration occurs, leading to a large number of small particles that are relatively harmless. Typical of toughened glass.

3) The third is the highest drop height at which the product did not break or when broke, broke in accordance with the style of break a) from the paragraph 1) above. If a glass breaks at the minimum drop height and the breakage is not in accordance with style of break a) from the paragraph 1) above then the last classification figure is zero.

Examples

Laminated may be 2 (B) 2
Toughened may be 1 (C) 3

Refer to BS EN 12600:2002 for full details of the tests.
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